

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of backwashing a membrane filtration system comprising:

~~the step of using permeate isolating a portion of liquid permeate remaining present in the system when the a filtration process is stopped; to provide liquid for backwashing the membrane pores during a backwashing process;~~

supplying a gas at a pressure less than a bubble point of membranes of the membrane filtration system;

applying the gas to the portion of liquid permeate; and

backwashing the membranes by displacing at least some of the portion of liquid permeate through pores in walls of the membranes.

2-3. (Canceled)

4. (Currently Amended) A method of filtering solids from a liquid suspension comprising:

immersing filtration membranes in the liquid suspension;

~~[[i)] filtering the liquid suspension through providing a pressure differential across the pores in walls of permeable, hollow the filtration membranes; immersed in the liquid said liquid suspension being applied to the outer surface of the porous hollow membranes to induce and sustain filtration through the membrane walls wherein:~~

~~a) some of the liquid suspension passes through the walls of the membranes to be drawn off as permeate from the hollow membrane lumens, and~~

~~b) at least some of the solids are retained on or in the hollow membranes or otherwise as suspended solids within the liquid surrounding the membranes;~~

producing a liquid permeate within lumens of the filtration membranes;

drawing off liquid permeate from the lumens;

periodically suspending the filtration process;
isolating liquid permeate remaining within the lumens; and
[[ii]] ~~periodically backwashing the membrane pores using the permeate~~
~~remaining within the lumens by applying a gas at a pressure below the a bubble point of~~
~~the filtration membranes to said the isolated liquid permeate to displace at least some of~~
~~the isolated liquid permeate within the lumens through the pores in the walls of the~~
~~filtration membranes in a direction opposite to that of filtration pores resulting in~~
~~removal the solids retained on or in the hollow membranes.~~

5. (Currently Amended) [[A]] The method of filtering solids from a liquid suspension
according to claim 4 wherein displacing at least some of the isolated liquid permeate
through the pores in the walls of the filtration membranes ~~during the backwashing step~~
~~the comprises removing solids are removed from the filtration membranes~~ into the ~~bulk~~
liquid suspension surrounding the filtration membranes.

6. (currently amended) [[A]] The method of filtering solids from a liquid suspension
according to claim 5 further including comprising the step of reducing the volume of the
~~bulk liquid suspension surrounding the filtration membranes~~ before ~~the backwashing~~
~~step~~ displacing at least some of the isolated liquid permeate through the pores in the
walls of the filtration membranes.

7. (Currently Amended) [[A]] The method of filtering solids from a liquid suspension
according to claim 6 wherein the volume of bulk liquid suspension surrounding the
filtration membranes is reduced by suspending provision of ~~said the~~ liquid suspension
while ~~continuing to provide~~ providing a pressure differential across walls of ~~said the~~
filtration membranes and ~~drawing of~~ permeate from the filtration membranes.

8. (Currently Amended) [[A]] The method of filtering solids from a liquid suspension
according to claim 5 including further comprising the step of removing at least part of
the ~~bulk~~ liquid suspension surrounding the filtration membranes containing the removed

solids by a sweep, drain-down or by a feed and bleed process to at least partially discharge the ~~bulk~~ liquid suspension surrounding the filtration membranes.

9. (Currently Amended) [[A]] The method of filtering solids from a liquid suspension according to claim 4 ~~including~~ further comprising using permeate remaining in ancillaries such as manifolds, headers, and piping ~~and the like~~ in addition to that in the filtration membrane lumens as a source of backwash liquid.

10. (Currently Amended) A method of filtering solids from a liquid suspension comprising:

applying the liquid suspension to lumens of filtration membranes;

[[i]] filtering the liquid suspension through ~~providing a pressure differential across the pores in~~ walls of ~~permeable, hollow~~ the filtration membranes; ~~having a liquid suspension applied to the inner surface of the permeable hollow membranes to induce and sustain filtration through the membrane walls wherein:~~

~~a) some of the liquid suspension passes through the walls of the membranes to be drawn off as permeate from the outer surface of said membranes, and~~

~~b) retaining at least some of the solids are retained on or in the hollow membranes or otherwise as suspended solids within the membranes,~~

forming liquid permeate on a shell side of a pressure vessel in which the filtration membranes are mounted;

drawing off liquid permeate from the shell side of the pressure vessel;

[[ii]] ~~stopping or~~ periodically suspending the filtration process; and

[[iii]] ~~periodically backwashing the membrane pores using the permeate remaining after the suspension of the filtration process by~~ applying a gas at a pressure below ~~the~~ a bubble point of the filtration membranes to said liquid permeate remaining within the shell side of the pressure vessel to displace at least some of the liquid permeate through the filtration membrane pores in a direction opposite to that of filtration ~~resulting in removal of the solids retained on or in the hollow membranes.~~

11. (Currently Amended) [[A]] The method of filtering solids from a liquid suspension according to claim 4 including further comprising increasing the amount of permeate available for backwashing when filtration is suspended by providing a further chamber or reservoir in a permeate flow circuit to increase the amount of permeate available for backwashing when filtration is stopped or suspended.

12. (Currently Amended) [[A]] The method of filtering solids from a liquid suspension according to claim 4 including the further comprising step of scouring of surfaces of the filtration membranes surfaces by flowing gas bubbles past the filtration membrane surfaces.

13. (Withdrawn) A filtration system for removing fine solids from a liquid suspension comprising:

- (i) a vessel for containing said liquid suspension;
- (ii) a plurality of permeable, hollow membranes within the vessel;
- (iii) means for providing a pressure differential across walls of said membranes such that some of the liquid suspension passes through the walls of the membranes to be drawn off as permeate;
- (iv) means for withdrawing permeate from the membranes; and
- (v) means for applying gas at a pressure below the bubble point to the liquid permeate within the system and the membrane lumens to affect a discharge of at least some of the liquid permeate in the lumens through the membrane walls to dislodge any solids retained therein and displace the removed solids into the liquid suspension surrounding the membranes.

14. (Withdrawn) A filtration system according to claim 13 wherein said membranes are mounted in a number of membrane modules and the membrane modules are used in a bank and connected to a manifold for distributing liquid suspension to and removing permeate from the system.

15. (Withdrawn) A filtration system according to claim 14 wherein the gas is introduced into the manifold of the bank of modules so that permeate within the manifold is utilized for backwash.

16. (Withdrawn) A filtration system according to claim 13 further including means to reduce the volume of liquid suspension in the vessel before the backwash so as to reduce the backwash waste volume.

17. (Withdrawn) A filtration system according to claim 16 wherein the volume of liquid suspension in the vessel is reduced by suspending flow of feed to the feed vessel while continuing to provide a pressure differential across walls of said membranes and withdrawal of permeate from the membranes.

18. (Withdrawn) A filtration system according to claim 17 wherein the pressure differential across walls of said membranes is obtained by application of a pressurized gas.

19-23. (Canceled)

24. (New) The method according to claim 1, wherein the permeate remaining present in the system when the filtration process is stopped consists of permeate present in the system on a side of a valve configured and arranged to isolate the filtration membranes from a second section of piping.

25. (New) The method according to claim 1, wherein isolating the portion of permeate comprises closing a valve, the valve configured and arranged to isolate the membranes from a second section of piping.

26. (New) The method according to claim 1, wherein backwashing is performed without the use of a backwash pump or a permeate holding tank.

27. (New) The method according to claim 1, wherein the permeate remaining present in the system when the filtration process is stopped consists of at least one of permeate remaining in at least one manifold in fluid communication with at least one membrane module, in at least one membrane module header, in piping associated with the at least one manifold and the at least one membrane module header, and in a permeate side of filtration membranes

28. (New) The method according to claim 1, further comprising draining down liquid suspension including the displaced isolated liquid permeate.

29. (New) The method according to claim 1, further comprising scouring the membranes with gas bubbles.